
A New Species, New Synonyms, and a New Combination in Brazilian Velloziaceae

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ABSTRACT. *Vellozia stenocarpa* Mello-Silva sp. nov. (Velloziaceae) is distinguished by very narrow fruits and quickly deciduous leaf blades. Morphoanatomic descriptions, illustrations, and comments on taxonomic relationships are presented. A new combination is made: *Barbacenia riparia* (N. L. Menezes & Mello-Silva) Mello-Silva. Three species are relegated to the synonymy of *B. markgrafii* Schulze-Menz, and the varieties of *Vellozia marcescens* L. B. Smith are merged. Distribution and morphological variation are discussed for each species.

A floristic study of the Velloziaceae of Grão-Mogol, Minas Gerais, Brazil (Mello-Silva, 1989) revealed the presence of 19 species, of which four were new to science. Three of these have already been described (Mello-Silva, 1991b; Mello-Silva & Menezes, 1988); the fourth is described in the present paper.

***Vellozia stenocarpa* Mello-Silva, sp. nov. TYPE:** Brazil. Minas Gerais: Joaquim Felício, Serra do Cabral, descida da serra, campo rupestre, 17°42'S, 44°14'W, 1,000 m alt., 12 Feb. 1988 (fl, fr), J. R. Pirani, W. W. Thomas, R. Mello-Silva & J. B. Fernandes 2217 (holotype, SPF; isotypes, K, MBM, NY, RB, UB). Figures 1–3.

Planta solitaria; caudice 8–120 cm longo. Folia trifaria; lamina mox caduca, 13–33 cm longa, 4–13 mm lata ad basim, lineari-triangulari, glabra, marginibus serrulatis, apice attenuato. Inflorescentia floribus singulis binis ternisve dispositis; pedunculo 6–15 cm longo, glabro vel apicem versus pauci-glanduloso. Flos hypanthio oblongo-trigono, 10–25 mm longo, 3–6 mm diam., glabro vel pauci-glanduloso praecipue ad angulas, ad ovarium pro $\frac{1}{5}$ partibus longitudinis suae adnato; tepalis violaceis, ellipticis, erecto-patentibus, 2.5–5.5 cm longis, 0.7–2 cm latis, glabris; staminibus 30, appendicibus minutis, vix laceratis, filamentis ca. 3 mm longis, antheris ca. 7 mm longis; stylo 1.6–2.5 cm longo; stigmatibus trilobo-peltatis, ca. 3–7 mm diam. Capsula 10–25 mm longa, 4–7 mm diam., parietibus lateralibus rumpentibus dehiscens; seminibus atro-castaneis.

Plant solitary; stem 8–120 cm tall. Leaves 9–12, spiro-tristichous, straight, erect-patent; leaf sheaths brown, brownish gray at apex, resinous; lamina 13–33 cm long, 4–13 mm broad, linear-triangular, attenuate, glabrous, soon deciduous, the margins serrate. Inflorescence with peduncles 1–3, 6–15 cm long, glabrous or with subsessile to sessile glands toward apex. Flower with hypanthium 10–25 mm long, 3–6 mm diam., oblong, trigonous, glabrous or with subsessile to sessile glands on angles and, rarely, between angles; ovary filling $\frac{1}{5}$ of the hypanthium; tepals 2.5–5.5 cm long, 0.7–2 cm broad, erect-patent, elliptic, violet, glabrous; stamens 30, the appendages inconspicuous, toothed, the filaments ca. 3 mm long, arched at base, the anthers ca. 7 mm long; style 1.6–2.5 cm long; stigma 3–7 mm diam., trilobed. Capsule 10–25 mm long, 4–7 mm diam., obovoid-oblong to oblong, trigonous, dehiscent by rupture of the lateral walls; seeds foveate, deep brown.

Leaf anatomy (Hatschbach 42520, Cordeiro CFCR 4107, Pirani 2217). Blade dorsiventral. Furrows about $\frac{2}{5}$ thickness of blade. Cuticle thickened on both surfaces. Adaxial epidermis uni-biseriate, abaxial epidermis uniseriate. Stomata mostly confined to furrows. Aquiferous uni-biseriate hypodermis present on both surfaces, extending adaxially to bundle sheaths and furrows as aquiferous parenchyma. Palisade mesophyll 3–4 cell layers thick, adaxially merging with lacunar mesophyll. Fibrovascular bundles surrounded by a distinct bundle sheath, 1–3 large vessels present in each fibrovascular bundle. Phloem strands 2, separated by fibers. Fibers extending as girders, adaxially to the aquiferous parenchyma and abaxially to the hypodermis. Bundles of subepidermal sclerified cells (1–)3 cells thick present beneath the adaxial surface and 1–2 cells thick beneath the abaxial surface or at the lower edges of the furrows.

Vellozia stenocarpa resembles *V. angustifolia* Goethart & Henrard in general aspect (although the former is more robust), in the shape and indumentum



Figure 1. *Vellozia stenocarpa* Mello-Silva. —A. Habit. —B. Leaf apex, adaxial surface. —C. Leaf margin. —D. Petal, with stamens at base. —E. Fruit with detail of glands. A, *Hatschbach* 42920. B, E, *Mello-Silva* CFCR 9664. C, D, *Simonis* CFCR 4107.

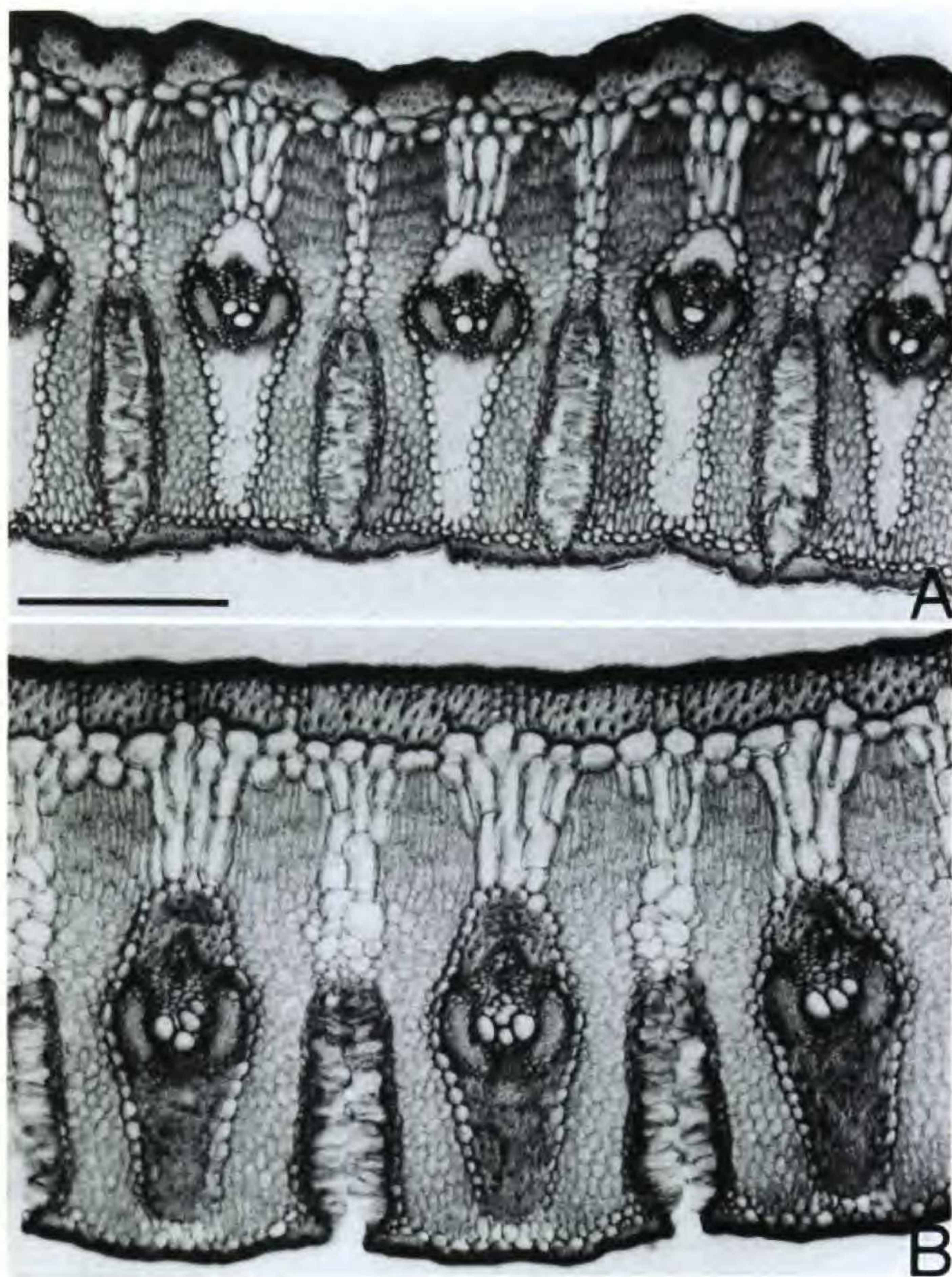


Figure 2. Cross section of median region of lamina of *Vellozia stenocarpa*. A, from *Hatschbach 42520*. B, from *Simonis CFCR 4107*. Scale bar = 0.2 mm.

of the hypanthium and fruit, and also in the structure of the leaf blade in transverse section. They differ chiefly in the number of stamens, 18 in *V. angustifolia* and 30 in *V. stenocarpa*, and in the leaves: marcescent, reflexed and resinous with a maximum width of about 3 mm in *V. angustifolia*; and deciduous, not reflexed, not resinous with a width of 4–13 mm in *V. stenocarpa*. The new species also resembles *V. compacta* Martius ex J. A. & J. H. Schultes in the soon deciduous leaves and in the hypanthium glandular on the angles. However, *V. compacta* reaches a height of up to 3 m and has much larger flowers with well-developed staminal appendages. In the leaves of *V. compacta* the fibrovascular bundles do not extend to the abaxial hypodermis, and the assemblage of the upper fibers in these bundles has the same dimensions as the lower one.

Vellozia stenocarpa occurs on the Espinhaço range in Minas Gerais, at Grão-Mogol and Serra do Cabral (Fig. 3). Individuals from Grão-Mogol are lower in stature (up to 60 cm tall), the hypanthium is glandular, and the tepals are smaller (up to 3 cm long). In the Serra do Cabral plants reach 1.2 m, the hypanthium may be completely glabrous, and the tepals are larger (up to 5.5 cm long). The leaves,

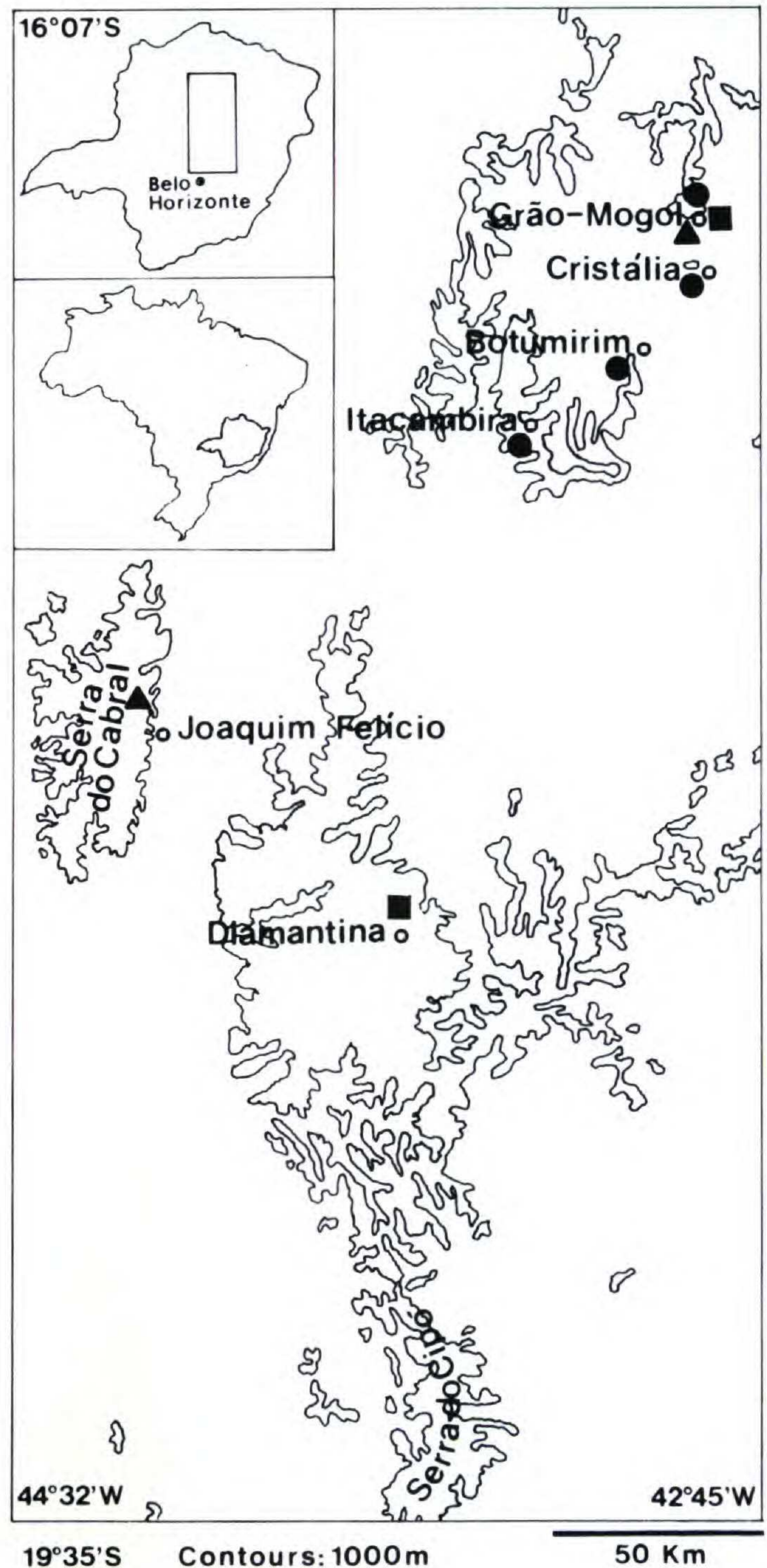


Figure 3. Portion of the Espinhaço range, north of Belo Horizonte in the state of Minas Gerais, Brazil, showing distribution of *Barbacenia markgrafii* (square), *Vellozia marcescens* (circle), and *V. stenocarpa* (triangle).

when they fall and dry, roll up and form cushions on the ground between the plants.

Paratypes. BRAZIL. **Minas Gerais**: Grão-Mogol, wet sandy campo with low outcrops, ca. 16 km W of Grão-Mogol, elev. 950 m, 17 Feb. 1969 (fr), *H. S. Irwin, R. Reis dos Santos, R. Souza & S. F. da Fonseca 23459* (HB, NY not seen, SP); arredores, 24 Mar. 1980 (fl, fr), *G. Hatschbach 42920* (MBM, NY not seen, SPF, US not seen), 27 Feb. 1983 (fl, fr), *E. Simonis & I. Cordeiro CFCR 4107* (SPF, U not seen); margens de córrego à saída da cidade na estrada para o rio Ventania, 900–1,000 m s.m., 25 Feb. 1986 (fr), *R. Mello-Silva, N. L. Menezes, T. B. Cavalcanti, J. Semir & N. S. Chukr CFCR 9664* (SPF); Joaquim Felício, estrada entre a ci-

dade e o Córrego da Areia, 22 Mar. 1994 (fl, fr), *P. T. Sano, V. C. Souza, R. M. Harley, C. M. Sakuragui & N. Roque CFCR 15383* (G, HUEFS, K, MO, SPF).

Barbacenia markgrafii Schulze-Menz in Markgraf, Notizbl. Bot. Gart. Berlin-Dahlem 15: 216. 1940. TYPE: Brazil. Minas Gerais: Grão-Mogol, rio Itacambirussu, sandiger, lichter Uferwald 700 m ü.M., 13 Nov. 1938 (fl), *Markgraf et al. 3519* (holotype, B not seen; isotype, RB). Figure 3.

Barbacenia albiflora L. B. Smith, Contr. U.S. Natl. Herb. 35: 292, pl. 12: figs. 69, 70. 1962. Syn. nov. TYPE: Brazil. Minas Gerais: Grão-Mogol, Serra Grão Mogol, N base of mountain, 600–700 m alt., 16 Aug. 1960 (fl), *Maguire et al. 49213* (holotype, US not seen; isotypes, NY not seen, R).

Barbacenia bibiriensis L. B. Smith & Ayensu, Smithsonian Contr. Bot. 30: 33, pl. 26, 37a, b. 1976. Syn. nov. TYPE: Brazil. Minas Gerais: Diamantina, Biri-biri, dos afloramentos rochosos, 11 Aug. 1972 (fl), *Hatschbach 30190* (holotype, US not seen; isotype, MBM).

Barbacenia sordida L. B. Smith & Ayensu, Smithsonian Contr. Bot. 30: 36, pl. 28, 37e, f. 1976. Syn. nov. TYPE: Brazil. Minas Gerais: sandstone precipices and adjacent cerrado, ca. 18 km W of Grão-Mogol, elev. 950 m, 21 Feb. 1969 (fl, fr), *Irwin et al. 23673* (holotype, US not seen; isotype, NY).

Distribution. Brazil. Minas Gerais: Grão-Mogol and Diamantina.

Smith & Ayensu (1976) separated the three species of *Barbacenia* Vandelli here treated on the basis of the length of the perigonial tube: equal to or less than the portion fused to the ovary in *B. markgrafii* and longer than this portion in *B. albiflora* and *B. sordida*. However, in the type of *B. markgrafii* the ovary is 1 cm long and the perigonial tube is 2 cm long, i.e., twice the length of the portion fused to the ovary. Therefore, the separation of *B. albiflora* and *B. sordida* from *B. markgrafii* on the basis of this character cannot be justified. The character used to distinguish *B. albiflora* from *B. sordida*, the length of the peduncle relative to the leaves, exhibits a wide range of variation. Some specimens have peduncles much shorter than the leaves, others have peduncles equaling or somewhat shorter than the leaves, while still others have peduncles somewhat to much longer than the leaves. A single population may include individuals with peduncles shorter than the leaves and others with peduncles longer than the leaves (*Menezes 1114, 1118; Mello-Silva CFCR 8338, 10072*). With respect to the characters here discussed the type specimens show no discontinuities relative to the other collections studied, indicating that they represent a single species.

Furthermore, in their key Smith & Ayensu (1976) distinguished *B. albiflora* (= *B. markgrafii*) from *B. bibiriensis* on the basis of flower color and the length of the hypanthium: white flowers with hypanthia 4 cm long in the former as opposed to green flowers with hypanthia 5 cm long in the latter. These characters vary in *B. markgrafii*: the flowers are green externally, sometimes with purplish patches, and white internally; and the hypanthium varies in length from 3 to 5 cm. In addition, the taxa share leaf blades with glandular trichomes and ciliate margins, and peduncles with two types of glandular emergences. Thus *B. bibiriensis* is here treated as a southern population of *B. markgrafii*.

Additional specimens examined. BRAZIL. Minas Gerais: Grão-Mogol, *Mello-Silva & Cordeiro CFCR 10072* (F, K, MBM, SPF, RB, US), *Mello-Silva et al. CFCR 8338* (RB, SPF, US), *CFCR 8977, 9657* (SPF), *Menezes 408, 1114, 1118, 1121, 1123, 1125* (SPF); Diamantina, *Hatschbach & Zelma 49766* (MBM, SPF), *Mello-Silva et al. 410* (K, MBM, MO, NY, RB, SPF, UB, US).

Vellozia marcescens L. B. Smith, Contr. U.S. Natl. Herb. 35: 289. 1962. TYPE: Brazil. Minas Gerais: Grão-Mogol, slopes and summit of Serra Grão Mogol, 900–1,000 m, 17 Aug. 1960 (fl, fr), *Maguire et al. 49259* (holotype, US not seen; isotypes, K not seen, NY not seen, R). Figure 3.

Vellozia marcescens L. B. Smith var. *minor* L. B. Smith, Contr. U.S. Natl. Herb. 35: 289. 1962. Syn. nov. TYPE: Brazil. Minas Gerais: Grão-Mogol, N base of mountain, 600–700 m, 16 Aug. 1960 (fr), *Maguire et al. 49219* (holotype, US not seen; isotypes, NY not seen, R).

Distribution. Brazil. Minas Gerais: Grão-Mogol, Cristália, Botumirim, and Itacambira.

When he described *Vellozia marcescens*, Smith (1962) established two varieties: *V. marcescens* var. *marcescens* with a branched stem to 30 cm tall, leaves to 7 cm long × 7 mm wide and a peduncle 15–20 mm long; and *V. marcescens* var. *minor* with a simple stem to 20 cm tall, leaves 4.5 cm long × 3.5 mm wide and a peduncle to 35 mm long. Subsequently, Smith & Ayensu (1976) maintained the two varieties but withdrew stem length as a diagnostic character. This left the branching of the stem, or lack thereof, as the only true distinguishing character between the varieties. Several collections (*Maguire 49219; Mello-Silva CFCR 8456, 9111; Hatschbach 41349, 41638*) include both branched and unbranched specimens. Other collections (*Martinelli 5838, Menezes 402*) with branched stems have leaf lengths exceeding those

described for the typical variety and peduncle lengths corresponding to those of *V. marcescens* var. *minor*. Still other collections (*Ferreira* 753, *Irwin* 23387) include specimens with leaf lengths and widths corresponding to those of both varieties and peduncle lengths appropriate to *V. marcescens* var. *minor*. By virtue of its simple stems and peduncle length *Giulietti* CFCR 3433 could belong to *V. marcescens* var. *minor*, but in its leaf measurements it seems closer to the typical variety. *Maguire* 49259, the type of *Vellozia marcescens*, is the only collection that matches the description of the typical variety well. This evidence renders the recognition of the varieties untenable.

Additional specimens examined. BRAZIL. **Minas Gerais:** Grão-Mogol, *Ferreira et al.* 753 (RB), *Giulietti* CFCR 3433 (SPF), *Hatschbach* 41349 (MBM, SPF, US not seen), *Hatschbach & Kasper* 41638 (MBM, US not seen), *Irwin et al.* 23387 (NY not seen, RB, UB, US not seen), *Martinelli* 5838 (RB, SPF), *Mello-Silva et al.* CFCR 8456 (F, K, SPF), CFCR 9111 (F, K, MBM, SPF), *Menezes* 639, 656, 661 (SPF), *Menezes et al.* 402 (F, K, MBM, RB, SPF, US), 1117 (BHCB, K, RB, SPF); Cristália, *Mello-Silva et al.* 488 (SPF); Botumirim, *Mello-Silva et al.* 504 (SPF), 654 (CTES, SPF); Itacambira, *Mello-Silva et al.* CFCR 9111 (F, K, MBM, SPF), *Pirani et al.* 2263 (NY, SPF, UB).

Barbacenia riparia (N. L. Menezes & Mello-Silva) Mello-Silva, comb. nov. Basionym: *Pleurostima riparia* N. L. Menezes & Mello-Silva, *Acta Bot. Bras.* 1 (Supl.): 196, figs. 1–10, 13–14. 1988. TYPE: Brazil. Minas Gerais: Grão-Mogol, *Mello-Silva et al.* CFCR 8400 (holotype, SPF; isotypes, K, RB, SP, US).

Distribution. Brazil. Minas Gerais: Grão-Mogol.

Pleurostima Rafinesque was established by Menezes (1980b), who cited the following generic characters: anthers basifixed, auriculate; stigmatic region subapical; and fruits prominently ribbed with seeds liberated after disintegration of the ovary walls. In contrast, the remaining taxa of the Barbacenioidae sensu Menezes (1980a) have anthers dorsifixed, nonauriculate; stigmatic region apical; and fruits dehiscing in other ways. However, *Barbacenia minima* L. B. Smith & Ayensu, *B. regis* L. B. Smith, and *B. coronata* Ravenna ex L. B. Smith & Ayensu (Mello-Silva, 1991a), along with two recently discovered species from Bahia and Minas Gerais, ex-

hibit characters of both *Barbacenia* and *Pleurostima*, rendering the circumscription of the latter artificial. Maintaining the broadly delimited *Barbacenia* sensu Smith & Ayensu (1976) avoids splitting the genus into probably polyphyletic taxa.

Additional specimens examined. BRAZIL. **Minas Gerais:** Grão-Mogol, *Hatschbach* 41244 (MBM, US not seen), *Martinelli* 5821 (RB, SPF), *Mello-Silva et al.* CFCR 8874 (SPF), *Menezes et al.* 1110 (BHCB, F, NY, P, R, SPF), *Pirani et al.* CFCR 858 (MBM, SPF).

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Literature Cited

- Mello-Silva, R. de. 1989. Velloziaceae de Grão-Mogol, Minas Gerais, Brasil. Dissertação de mestrado, Universidade de São Paulo.
- . 1991a. The infra-familial taxonomic circumscription of the Velloziaceae: A historical and critical analysis. *Taxon* 40: 45–51.
- . 1991b. A new species of *Vellozia* from the Espinhaço Range, Brazil, with some considerations on the section *Xerophytoides*. *Kew Bull.* 46: 321–326.
- & N. L. de Menezes. 1988. Duas espécies novas de Velloziaceae de Minas Gerais. *Acta Bot. Bras.* 1 (Supl.): 195–207.
- Menezes, N. L. de. 1980a. Evolution in Velloziaceae, with special reference to androecial characters. Pp. 117–139 in C. D. Brickell, D. F. Cutler & M. Gregory (editors), *Petaloid Monocotyledons: Horticultural and Botanical Research*. Academic Press, London.
- . 1980b. Re-establishment of genus *Pleurostima* Rafinesque (Velloziaceae). *Revista Brasil. Bot.* 3: 37–47.
- Smith, L. B. 1962. A synopsis of the American Velloziaceae. *Contr. U.S. Natl. Herb.* 35: 251–292, pl. 1–12.
- & E. S. Ayensu. 1976. A revision of American Velloziaceae. *Smithsonian Contr. Bot.* 30: i–viii + 1–172.